BEFORE THE

ORIGINAL

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules to Establish Rules and Policies Pertaining To a Mobile-Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands	)	CC Docket No. 92-166

To: The Commission

REPLY COMMENTS OF TRW INC.

Norman P. Leventhal
Raul R. Rodriguez
Stephen D. Baruch
David S. Keir
Walter P. Jacob

Leventhal, Senter & Lerman
2000 K Street, N.W.
Suite 600
Washington, D.C. 20006
(202) 429-8970

Attorneys for TRW Inc.

June 20, 1994

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REPLY COMMENTS OF TRW INC.

TRW Inc. ("TRW"), by its attorneys and pursuant to Section 1.415 of the Commission's rules, hereby replies to comments filed in response to the Commission's Notice of Proposed Rule Making, 9 FCC Rcd 1094 (1994) ("NPRM") in the above-captioned docket.

INTRODUCTION AND SUMMARY

Despite the well-known contentiousness of this proceeding, there is remarkable concurrence among the applicants seeking to provide Mobile-Satellite Service ("MSS") in the 1610-1626.5 MHz and 2483.5-2500 MHz bands ("MSS/RDSS bands"), and among all commenters in general, concerning the regulatory approach

that the Commission should adopt in its final service rules in this docket. No commenter favors the adoption of common carrier regulation for space segment capacity providers in this service, and there is an equivalent lack of support for assigning licenses in this service by competitive bidding.

To the still significant extent that disagreement remains, the areas of controversy are focussed upon the basic eligibility requirements that the Commission proposes to impose upon applicants, and the precise manner in which spectrum sharing should be implemented -- both among multiple MSS service providers in the allocated bands and between the MSS systems and other users in these and adjacent bands. It must be noted, however, that the current applicants express a universal belief that an acceptable sharing plan can be adopted, and most agree that the Commission's basic initial approach can be the foundation for final rules.

One of the principal matters in dispute among many commenters is the need for a transitional sharing plan to account for the fact that the Russian Global Navigation System ("GLONASS") currently operates within the 1610-1616 MHz band and, under almost any scenario, is likely to remain there when the first MSS Above 1 GHz satellites are launched. Most of the current applicants take the view that the Commission must take some action now to address the GLONASS situation. Two other applicants in particular share TRW's strong belief that an interim sharing approach must be adopted for use until the GLONASS problem is resolved and that

the successful formulation of such a plan is essential to a workable spectrum sharing solution in this proceeding.

In the event that an equitable sharing compromise cannot be reached, TRW agrees with the other parties commenting that competitive bidding would be a wholly inappropriate mechanism for assigning spectrum in the inherently global MSS Above 1 GHz service. Auctioning the rights to spectrum in this country would inevitably set off an international chain reaction that could doom to failure what should otherwise be one of the key elements of the new global information infrastructure. TRW observes, however, in contrast to some of the other commenters and to the Commission's initial conclusion, that the use of comparative hearings to decide who will be licensed in the MSS/RDSS bands would not necessarily be any more time consuming in the long run than the use of random selection procedures -- and would clearly be preferable to lotteries in terms of determining the optimal use of this spectrum.

In these reply comments, TRW focuses on the areas where the views of one or more parties diverge significantly from the Commission's initial proposals or dispute TRW's views concerning modification of these proposals. TRW believes that the Commission should proceed as follows:

- ☞ The Commission should adopt with only minor modifications the technical qualification requirements proposed in the NPRM. The Commission should finalize its proposal to limit the MSS Above 1 GHz

bands to non-geostationary systems. It should also adopt its global and domestic coverage standards with several clarifying changes, including a statement that it will not specify which sorts of service MSS space segment providers must accommodate, and modification of the definition of "all areas of the world, with the exception of the polar regions." The Commission should not adopt additional technical requirements.

☞ As virtually all commenters agree, the Commission should correct its initial formulation of the financial standard to be applied to MSS Above 1 GHz applicants by deleting the reference to the availability of "uncommitted" funds, and clarifying that the initial year for the purpose of determining first year operational expenses should begin at the point where a system is capable of accommodating providers of commercial service.

☞ In response to the overwhelming concern of various commenters, the Commission must adopt a transitional sharing plan that will remain in effect until the Russian GLONASS system is either shifted below 1606 MHz or need not be protected globally. This is a crucial step toward initiation of competitive service in these bands on fair and equitable terms.

☞ The Commission must rectify the inequity of its proposal that would automatically remove 3.1 megahertz of spectrum from the band set aside for code division multiple access ("CDMA") modulation in the event that only one such system is launched. This approach is prejudicial to all of the potential CDMA licensees, and to the public interest, as it does not consider spectrum efficiency considerations applicable to CDMA systems; does not take into account the differences in the interservice sharing environment between the upper and lower portions of the L-band allocation; ignores the possibility of foreign systems in these bands; unreasonably fails to provide a corresponding opportunity for CDMA systems to move into the bands above 1621.35 MHz upon the failure or inefficient spectrum use by any frequency division multiple access/time division multiple access ("FDMA/TDMA") systems implemented there; and deprives all CDMA applicants of necessary certainty in the areas of system design, financing and business planning.

☞ The Commission should reject, as inconsistent with the international and domestic allocation of these bands, the self-serving Motorola Satellite

Communications, Inc. ("Motorola") proposal of "out-of-band" emission limitations that would, in effect, elevate its secondary downlinks in the L-band to de facto primary status. As an applicant seeking to make use of a secondary allocation, Motorola alone is responsible for ensuring that any necessary guard band or other protection between CDMA and FDMA/TDMA transmissions is effective to avoid interference.

- With respect to interservice sharing constraints, the Commission should dismiss attempts by some parties to obtain additional protections for systems or services beyond what they agreed to during the negotiated rulemaking.

- All licensees in the MSS Above 1 GHz service must also be required to maintain the same operating parameters, e.g., spectrum assignments, globally that they are authorized to use in the United States, in order to avoid the chaos that would result from individual licensees seeking access to the U.S.-allocated spectrum of others on a country-by-country basis.

- The Commission should proceed to make feeder link assignments in the Ka-band for applicants that have sought them.

- With the exception of the modifications advocated by TRW in its initial comments, the Commission should adopt its service rules as proposed in the NPRM. In particular, the Commission must retain its requirement that all satellites within a system remain "technically identical" for the term of the license, unless modified by formal application with opportunity for comment. The Commission should also decline to adopt changes in its timetable for renewal applications, or in its system implementation milestones.

In order to provide concrete proposals for the Commission's review, TRW has included as Attachment B hereto its suggested changes to the text of the Commission's proposed rules. With these appropriately modified rules in place, the

Commission should have a final decision that all eligible applicants will be able to support in order to facilitate the expeditious introduction of service.

DISCUSSION

I. QUALIFICATION REQUIREMENTS

A. TECHNICAL QUALIFICATIONS

1. The Commission Should Finalize Its Sound Decision To Limit The MSS Above 1 GHz Service To Systems Employing Non-Geostationary Satellite Orbits.

a. The Commission Has The Undisputed Legal Authority And An Obligation To The Public To Exclude Geostationary Systems From The MSS/RDSS Bands.

With the exception of American Mobile Satellite Corporation ("AMSC") and COMSAT Corporation ("COMSAT"), which themselves are authorized to operate or participate in the operation of geostationary MSS systems in frequency bands not under consideration in this proceeding, every commenter addressing the Commission's proposed technical qualification requirements for MSS Above 1 GHz systems supports the Commission's proposal to exclude geostationary systems from the MSS/RDSS bands.[1/] The comments filed in response to the Commission's NPRM leave no

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1/ See, e.g., Comments of Constellation Communications, Inc. ("Constellation Comments") at 15-16; Comments of Ellipsat Corporation ("Ellipsat Comments") at 17-21; Comments of Motorola Satellite Communications Inc. ("Motorola Comments") at 21-25; Comments of Loral Qualcomm Partnership, L.P. ("LQP Comments) at 11-19; Comments of TRW Inc. ("TRW Comments") at 11-25.

doubt but that the Commission has both the legal authority and an obligation to the public to adopt service rules excluding geostationary systems from these bands.

In its comments, AMSC -- the only party that has applied to operate a geostationary system in the MSS/RDSS bands -- does not contest the Commission's legal authority, under United States v. Storer Broadcasting Co.,[2/] to adopt a threshold eligibility requirement excluding geostationary systems from this service; it merely argues -- incorrectly, as TRW demonstrates herein -- that it would be unwise to do so.[3/] COMSAT, which seeks in its comments to reserve a place in the MSS/RDSS bands for Inmarsat-P service without even applying for authority to make use of the bands,[4/] also fails to address the Commission's legal authority on this issue. It is undisputed, therefore, that the Commission may adopt a rule excluding geostationary systems from the MSS/RDSS bands.

There also is overwhelming agreement among the commenters on the tremendous social and economic value of the global service that will be provided to the public by non-geostationary MSS Above 1 GHz systems, and with the Commission's tentative determination that precluding geostationary systems will hasten

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2/ See United States v. Storer Broadcasting Co., 351 U.S. 192 (1956) ("Storer").

3/ As Motorola and TRW observe in their comments, Storer gives the Commission the power to proceed by rulemaking and without a hearing even though an application that is pending may have to be dismissed as a result of the rules that the Commission adopts. See Motorola Comments at 29; TRW Comments at 11-15.

4/ See Comments of Comsat Corporation ("Comsat Comments") at 6-7.

the establishment of the MSS Above 1 GHz service.[5/] Indeed, all commenters comparing geostationary and non-geostationary systems -- except, of course, AMSC and COMSAT -- agree with the Commission that non-geostationary systems offer a plethora of technological and economic benefits that geostationary systems cannot hope to provide.[6/] As Ellipsat Corporation ("Ellipsat") and Motorola note, the exclusion of geostationary systems from the limited MSS/RDSS bands is necessary to facilitate provision of these new services, with their attendant technological and economic benefits.[7/] The exclusion of geostationary systems from the MSS/RDSS bands would therefore plainly be in the public interest.

5/ See, e.g., Constellation Comments at 4-8; Ellipsat Comments at 2-3, 18-20; Comsat Comments at 1-2; Comments of Mathis & Associates ("Mathis Comments") at 1; Comments of Conus Communications Company Limited Partnership ("Conus Comments") at 1-2; Comments of Crow Associates ("Crow Comments") at 1; TRW Comments at 17-25.

6/ See, e.g., Constellation Comments at 7-8; Ellipsat Comments at 18-20; Crow Comments at 1; Comments of Loral/Qualcomm Partnership, L.P. ("LQP Comments") at 11-15; Motorola Comments at 21-25; TRW Comments at 17-25. In this regard, it should be noted that Inmarsat, an established provider of geostationary-satellite based mobile services, has selected Intermediate Circular Orbits, not a geostationary orbit, for personal communications satellite services it expects to provide in the 2 GHz band. This decision was reached after nearly three years of study.

7/ Ellipsat Comments at 20-21; Motorola Comments at 31.

b. AMSC Should Not Be Assigned Additional Spectrum In The MSS/RDSS Bands, Especially As It Has Not Begun To Use The Bands It Has Been Allotted On A Monopoly Basis.

TRW agrees with Ellipsat, Motorola, Constellation Communications, Inc. ("Constellation") and Loral/Qualcomm Partnership, L.P. ("LQP") that the Commission must not allow AMSC to warehouse spectrum in the valuable MSS/RDSS bands based on its speculative projections of demand for its system, when it has not even begun to use the other bands it has been allotted for that system on a monopoly basis.[8/] TRW finds persuasive LQP's position that the principles underlying the Commission's existing domestic fixed-satellite service ("DOMSAT") policies preclude AMSC from expanding its system into the spectrum allocated for MSS Above 1 GHz.[9/] Although the Commission has recognized that "speculative showings of

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8/ See Constellation Comments at 17; Ellipsat Comments at 21; LQP Comments at 15-17; Motorola Comments at 33.

9/ See LQP Comments at 15-17 & n.9 (citing Licensing Space Stations in the Domestic Fixed-Satellite Service, 1 FCC Rcd 682, 685 (1986) ("DOMSAT")). Under its established policy, the Commission grants new domestic satellite licensees an initial authorization to construct three satellites and to launch two of these, and requires "applicants seeking expansion capacity, that is, additional orbital assignments beyond these two, to demonstrate that existing satellites are 'essentially filled' before additional in-orbit satellites are authorized." See DOMSAT, 1 FCC Rcd at 685 (citing Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions of Part 25 of the Rules and Regulations, 54 R.R.2d 577 (1983); Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service, 84 F.C.C.2d 584 (1981)). In fashioning this rule, the Commission "sought to achieve a proper balance between providing operators with planning certainty for expansion capacity and the need to prevent applicants from warehousing orbital

(continued...)

the need for expansion capacity may be unavoidable when a licensee has unlaunched satellites," it has rejected such showings as inadequate when a licensee has been granted capacity that is "sufficient to meet future needs" and provides "no documentation of actual usage commitments to justify that its expectations of greater need will be met."[10/] The spectrum that AMSC has already been granted on a monopoly basis is quite clearly "sufficient to meet [its] future needs," and, as LQP correctly observes, "AMSC here has not presented evidence of need for expansion into the 1.6/2.4 GHz band."[11/]

The Commission has previously excluded satellite system applicants from crowded bands to permit the effective use of the available spectrum. As Ellipsat correctly notes, the Commission excluded a proposed non-geostationary (or "LEO") satellite system from the bands designated for geostationary MSS use in 1992 under conditions similar to those in the present proceeding, citing, inter alia, the need for tight coordination in order "to facilitate sharing of the limited spectrum

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[9/](...continued)
assignments and blocking new entry by qualified companies at a later date." DOMSAT, 1 FCC Rcd at 685. Although AMSC seeks additional spectrum in this proceeding rather than orbital assignments, the principle remains the same: The Commission should not allow a party that has already been granted the means by which to initiate a proposed service to warehouse additional valuable resources for its own use based on a purely speculative showing.

[10/] DOMSAT, 1 FCC Rcd at 685.

[11/] LQP Comments at 16 & n.9.

resource."[12/] The Commission explained its decision in part by noting that it was "actively pursuing in other fora allocation proposals for LEO satellite service."[13/]

AMSC itself concedes that the spectrum available for use by MSS systems is severely limited,[14/] and the Commission has already made ample allocations for AMSC's proposed system in other bands.[15/] In fact, AMSC already has been granted exclusive domestic access to more spectrum than the Commission has proposed to make available to the five non-geostationary MSS Above 1 GHz applicants on a shared-use basis. Now that the Commission has obtained the invaluable and limited allocations that it sought for non-geostationary systems, it must not take any action that would make the sharing of those bands unnecessarily difficult.[16/] Indeed, given the current spectrum constraint that requires the five non-

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12/ See Ellipsat Comments at 18 & n.18 (citing Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services ("Land Mobile Satellite Service Decision"), 7 FCC Rcd 266, 273 (1992)).

13/ Land Mobile Satellite Service Decision, 7 FCC Rcd at 273.

14/ AMSC Comments at 5.

15/ The Commission must look with great skepticism upon AMSC's claim that "damage" will result to its planned system unless it is allowed to operate in the MSS/RDSS bands. See AMSC Comments at 18. What this claim means, if true, is that AMSC will be unable to establish a viable system in its monopoly allocation. This may require the Commission to revisit its decision to grant AMSC a license.

16/ Contrary to AMSC's claims, the Commission's decisions relating to wireless cable are in no way "instructive of the need to allow AMSC access to the newly-allocated MSS (continued...)

geostationary systems to share the MSS/RDSS bands (while AMSC has exclusive domestic use of its bands), it is wholly appropriate for the Commission to give future priority to the legitimate expansion needs of the sharing-capable non-geostationary systems in any new MSS bands that may become available.

16/(...continued)

bands." See AMSC Comments at 18 & n.22. In Amendment of Parts 2, 21, 74 and 94 of the Commission's Rules and Regulations in Regard to Frequency Allocation to the Instructional Television Fixed Service, the Multipoint Distribution Service, and the Private Operational Fixed Microwave Service, 94 F.C.C.2d 1203, 1245 (1983), the Commission sought to encourage competition in the new Multichannel Multipoint Distribution Service ("MMDS") by making two groups of channels available for use by competing operators in large service areas; it chose not to create more such groups so as to hold sufficient spectrum in reserve for use by the Instructional Fixed Television Service. Seven years later, the Commission concluded that its ownership restrictions had prevented MMDS from becoming a viable competitor to cable service, and therefore lifted the restrictions so that local MMDS monopolies could be established. Amendment of Parts 21, 43, 74, 78, and 94 of the Commission's Rules Governing Use of the Frequencies in the 2.1 and 2.5 GHz Bands Affecting: Private Operational-Fixed Microwave Service, Multipoint Distribution Service, Multichannel Multipoint Distribution Service, Instructional Television Fixed Service, and Cable Television Relay Service, 5 FCC Rcd 6410, 6411-12 (1990). The basis for AMSC's reliance on these decisions is not readily apparent. If the problem MMDS faced was "too little spectrum for any successful systems," as AMSC suggests, see AMSC Comments at 18 & n.22, adding an additional system -- as AMSC would add itself to the systems in the MSS/RDSS bands -- would only have aggravated the problem, not solved it. If, however, AMSC is proposing that the creation of a monopoly in the MSS/RDSS bands is the way to resolve the differences among the MSS Above 1 GHz applicants, the decisions are inapposite. In its second MMDS decision, the Commission was allowing an MMDS monopoly to be created in order to foster competition with cable television monopolies. Here, monopolist AMSC would be insulated from competition.

c. AMSC's Proposal To Use The MSS/RDSS Bands Is Substantively Flawed And Impractical.

AMSC attempts to justify its expansion into the MSS/RDSS bands by characterizing its system proposal as "the most realistic, practical and capable of prompt effectuation."[17/] Nothing could be farther from the truth. First of all, there is no small irony in AMSC's claim that its proposal to incorporate the MSS/RDSS-band spectrum -- or at least the L-band portion at 1616.5-1626.5 MHz -- is capable of "prompt effectuation." The Commission has rejected AMSC's proffered companion allocation at 1515-1525 MHz, and AMSC has yet to amend its application to specify an alternate downlink band.[18/] Clearly, the absence of a downlink allocation makes "prompt effectuation" of AMSC's system unlikely at best.

TRW also notes that AMSC has already missed its designated launch milestone date of July 1993 (for its AMSC-1 satellite) by almost a year, and no launch will occur under present plans until at least the first half of 1995.[19/] Only recently, AMSC sought the Commission's indulgence for another in a seemingly endless stream of requests for extension of the milestones for the construction of its

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17/ AMSC Comments at 17.

18/ See id. at 6 & n.7 (AMSC discusses downlink band; fails to identify specific band that would be a substitute for band rejected by Commission).

19/ The AMSC-1 satellite is the only one of AMSC's three authorized spacecraft that would not include MSS/RDSS-band capabilities.

system.[20/] Not only would AMSC's second and third satellites not be "promptly effectuated" following a grant of its application; AMSC would undoubtedly use such a grant as a basis for seeking further delays in the milestones for the already-authorized AMSC-2 and AMSC-3 satellites.

d. As The Non-Geostationary Applicants Have Previously Shown, Geostationary Systems Are Neither Technically Nor Economically Superior.

AMSC devotes the bulk of its comments to rehashing arguments against non-geostationary systems that TRW and the other non-geostationary applicants have repudiated in the past. TRW addresses these arguments once again in the attached Technical Appendix. There are, however, several aspects of AMSC's assertion that

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20/ See Application of AMSC Subsidiary Corporation for Authority to Extend the Milestone Dates for Commencement of Construction of the AMSC-2 and AMSC-3 Satellites, File Nos. 13-DSS-AMEND-94, 14-DSS-AMEND-94 (seeking extension of milestone for commencement of construction until January 1995, and corresponding extensions for completion and launch dates). See also Public Notices, Report Nos. DS-1123 (Sept. 18, 1991) (seeking one-year extension of all milestone dates for AMSC-2 and AMSC-3, with construction to commence July 1992); DS-1167 (Feb. 12, 1992) (seeking, inter alia, extension of milestone dates for completion of construction and launch of AMSC-1 until April 1994 and September 1994, respectively); DS-1216 (July 22, 1992) (seeking extension of launch date for AMSC-1 until December 1994); DS-1226 (Aug. 26, 1992) (seeking extension of milestone for commencement of construction of AMSC-2 and AMSC-3 until January 1993), correction, DS-1252 (Nov. 12, 1992), erratum, DS-1254 (Nov. 18, 1992); DS-1286 (Feb. 24, 1993) (seeking extension of milestone for commencement of construction of AMSC-2 and AMSC-3 satellites until January 1994, and corresponding extensions for completion and launch dates). In light of this record, AMSC's assertions that its system "does not exist merely on paper" and is "currently providing the . . . state-of-the-art technological advances that other proponents can only hope to offer" can hardly be taken seriously. See AMSC Comments at 17.

"geostationary satellites are better than non-GSO satellites from a technical perspective,"[21/] upon which TRW wishes to comment below.

In particular, AMSC's attempt to minimize the unquestionable value of the handheld service that non-geostationary systems will provide is nothing short of an admission that AMSC has no intention of offering truly handheld service via its proposed system.[22/] Indeed, AMSC states that it "has made the market judgement that the public will prefer higher-quality service with a vehicle-mounted, higher-power mobile unit."[23/] The ability to serve hand-held, low-power transceivers is one of the key advantages that non-geostationary systems offer to the public. The public's access to those benefits must not be limited by a competitor that has chosen -- based on a more parochial view of the marketplace -- not to provide them.

21/ Id. at 21.

22/ In its recent application to provide MSS in the 2 GHz band, AMSC stated that users could employ handheld terminals that would be interoperable with terrestrial PCS. See Personal Communications Satellite Corporation, Application for Authority to Construct a Domestic Communications Satellite System for the Provision of Mobile Satellite Service, File Nos. 24-DSS-P-94 and 25-DSS-P-94, at 20-21 (April 7, 1994). However, AMSC's "handheld" terminals would be dependent for many of their key functions on "vehicular boosters" or on other equipment that could not be moved during operation. Id. There is a world of difference between the awkward, bulky, and expensive pseudo-handheld units being described by AMSC and the truly portable and inexpensive units that the nongeostationary MSS systems would use for handheld services.

23/ AMSC Comments at 24-25. Comments such as this one by AMSC mean that the Commission must disregard AMSC's appendix on "Tritium," a theoretical system that might permit handheld service (albeit by means of unwieldy, 55-foot satellite antennas) but which AMSC obviously has no plans to build.

AMSC's effort to deny that non-geostationary systems will offer less time delay in communications than will geostationary systems also is off the mark.[24/] The "technical access delay" that AMSC foresees for non-geostationary systems as a result of the need to protect the Radio Astronomy Service ("RAS") is substantially overstated. Microprocessors in the handsets employed by users of some non-geostationary systems will monitor the position of the handsets with respect to RAS sites (e.g., via the Global Positioning Service ("GPS")) at all times, and will thus need no additional time at the start of a transmission to determine that position. For systems that, like Odyssey,[25/] may participate in beacon systems to protect RAS sites, position determination capability will be unnecessary, and the beacon system will not add any delay.[26/]

AMSC's comments contain "a conservative timing budget for a CDMA [nongeostationary] system using LEO satellites" that predicts voice communications delays for such systems of 195 milliseconds.[27/] AMSC states that such a delay "is

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24/ Id. at 27, and Technical Appendix thereto at 3-4.

25/ Odyssey is a trademark of TRW Inc. Odyssey is a satellite telecommunications system which is to be comprised of a constellation of 12 satellites in medium earth orbit.

26/ See TRW Comments at 120-21.

27/ AMSC Comments, Technical Appendix at 4.